TOP TRICKS FOR HOUDINI 17

Houdini ENGINE™ Houdini™ SideFX®

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Discover how to upgrade your physical simulations with the latest release from SideFX

Banshee, the latest version of Houdini from SideFX, may just be the most powerful release of the physical simulation tool yet. New to Houdini 17 are a host of key features including a new Vellum multi-solver for creating fast cloth, as well as hair, soft bodies and grains. Material-based destruction tools also make it simpler to set up destruction and art direct too. Other new tools like Soft Constraints, Convex Decomposition will help prefracture materials including concrete, glass and wood while building constraint networks automatically to tie everything together. Another addition is that of new UV tools which automatically seam and provide accurate flattening, allowing for a fully procedural workflow.

The Whitewater Solver is also now more organic, realistic and foamy with an accurate relationship to the source FLIP simulation. Terrain now also includes updated, advanced erosion tools that provide more control over details such as fluvial lines, river banks and debris. Hierarchical Scattering now makes placement of elements more efficient, too.

Other features include Retime SOP for stretching or slowing simulated data with effective interpolation and blend options to create clean and realistic results, a PolyDraw tool for interactive modelling, a new animator-friendly timeline for character animation and a new glTF importer and exporter (based on feedback from the gamedev community), a 3ds Max plugin, a Unity v2.0 plugin and improvements to the Maya and Unreal Engine 4 plugins. So what are you waiting for? Dive in to Houdini 17 Banshee now!

CONTRIBUTORS

ANDRIY BILICHENKO
vimeo.com/cgfaun
3D artist

IAN BONIFACIC
polymachine.com
Junior 3D artist at Polymachine

LIAM HOYLE
sidefx.com
MotionFX intern at SideFX

SUNDEEP MUKALA
sidefx.com
FX intern at SideFX

JOHN MARIELLA
sidefx.com
Senior production consultant

SARA ABRIL RASCÓN ESPINOZA
sararascon.com
Technical artist at SideFX

SEELAN VAMATHEVA
sidefx.com
Senior software developer: games technology

IGOR ZANIC
vimeo.com/igorzanic
FX artist

RAJENDRA KHIRODKAR
sidefx.com
FX intern at SideFX

FIANNA WONG
sidefx.com
Technical marketing lead at SideFX

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Lion made using Houdini 17

VELLUM

SUBSTEPS VS CONSTRAINT ITERATIONS

Each Substep runs a given number of Constraint Iterations. A quick way to gauge how many are needed per step is to make a rough estimate of how many edges exist across the geometry. For fast moving cloth and collisions, increased Substeps would be best. For all else, increased Constraint Iterations would be cheaper. **Sara Abril Rascón Espinoza**

PANELLING SHIRT

The main shape consists of separate curves that were fused, so each segment can be grouped and resampled independently. Planar Patch from Curves converts the silhouette into a triangulated mesh. Another curve can be placed inside the silhouette to 'guide' the topology flow or create straight lines inside the generated mesh. **Sara Abril Rascón Espinoza**

LONG HAIR

Self Collisions can be disabled for optimisation and Glue can be used in its place. This creates a network of constraints on the guide's points that propagates to nearby curves, mimicking clumping. Hairs can detach by enabling Breaking. On the solver, each Glue constraint's stress ratio can be visualised, which is helpful to see! **Sara Abril Rascón Espinoza**

SHORT HAIR

To prevent hair falling flat against the scalp and losing volume, a ramp can be used through a wrangle to create a soft falloff, controlling bend stiffness from root to tip. Another ramp was used to drive Glue and Attach to Geometry constraints, so that roots hold shape without stiffening the tips. **Sara Abril Rascón Espinoza**

MATERIAL-BASED FRACTURING

RIGID BODY PAINT NODE

The Rigid Body Paint Node stores the values of the painted areas by creating its own float attribute, which can be later transferred to the RBD Material Fracture SOP to create scatter points. Areas with dense paint will fragment into more pieces.

Additionally, using this (vs Paint SOP) will allow you to keep the painted areas even if you change the resolution of the geometry. **Sundeep Mukala**

SOFT CONSTRAINT

In a default soft constraint setup, you have stiffness and damping ratio. When the constraint's angle is higher than the given

degree (angle) value, the constraints switch and tend to break.Having more resolution to the fracture results in more flexibility, such as with bending for example. **Sundeep Mukala**

UVS

UV AUTOSEAM

UV Autoseam will try to find the optimal seams on your mesh, based on curvature. You can then plug the resulting seam selection into a UV Flatten to unwrap and start laying our your UVs. **Fianna Wong**

UV FLATTEN

In addition to unwrapping UVs, you can further edit UV islands by using Straighten Edge Loops (for example, on a leather belt) or Rectify Groups of Quads (to force as much as possible, a uniform unwrap of any UV island into an evenly scaled and straightened quad-filled UV island (eg bricks). **Fianna Wong**

UV LAYOUT (PACKING)

You can now specify rotation increments for your UV island rotation iterations, and even newer, you can pack UVs to be even tighter by using Stack Identical Islands (overlaps same UV islands) and if your mesh has symmetry, use Match Mirrored Islands for maximum cram (flips and overlaps same UV islands). **Fianna Wong**

UV LAYOUT (UDIMS)

Interactively assign and create your UDIM tiles by selecting any UV island and typing in the desired UDIM tile. Use the overrides for scaling and offset to prioritise which UDIM tile or UV island requires bigger real estate (texture resolution). This is nondestructive, so adjust freely as needed. **Fianna Wong**

WHITEWATER

WHITEWATER SOLVER

With the new Whitewater Solver, there are a lot of new attributes which are very different from the old solver. Testing these new attributes on wedge tests is the best way to learn how they work together or by themselves. Testing the same setup on different scenes is also important, because you can see how they work and whether you have the same result or otherwise. **Igor Zanic**

RUNNING FASTER

Using OpenCL can really speed up the simulation times, but due to memory limitation on our GPU, the sim can crash or become unstable. You can run the sim on a smaller region and get results faster than just running the final sim without OpenCL. With the new

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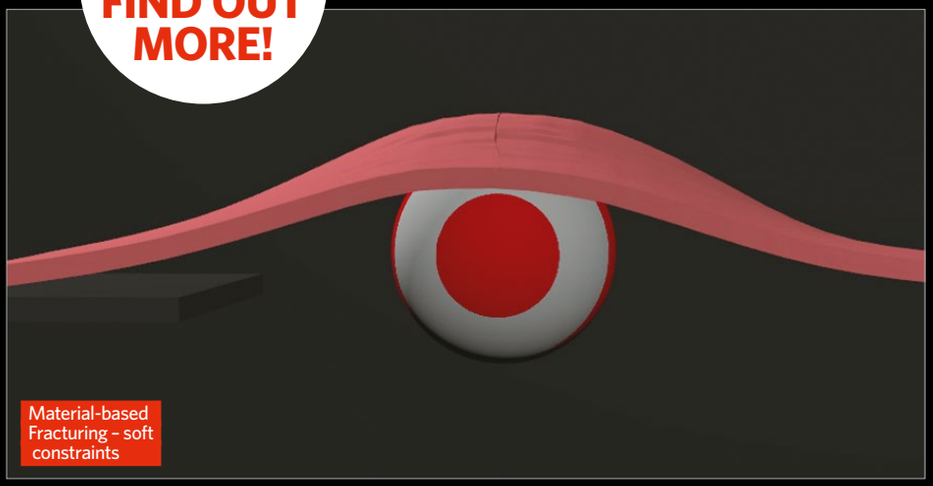
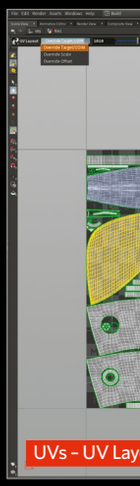
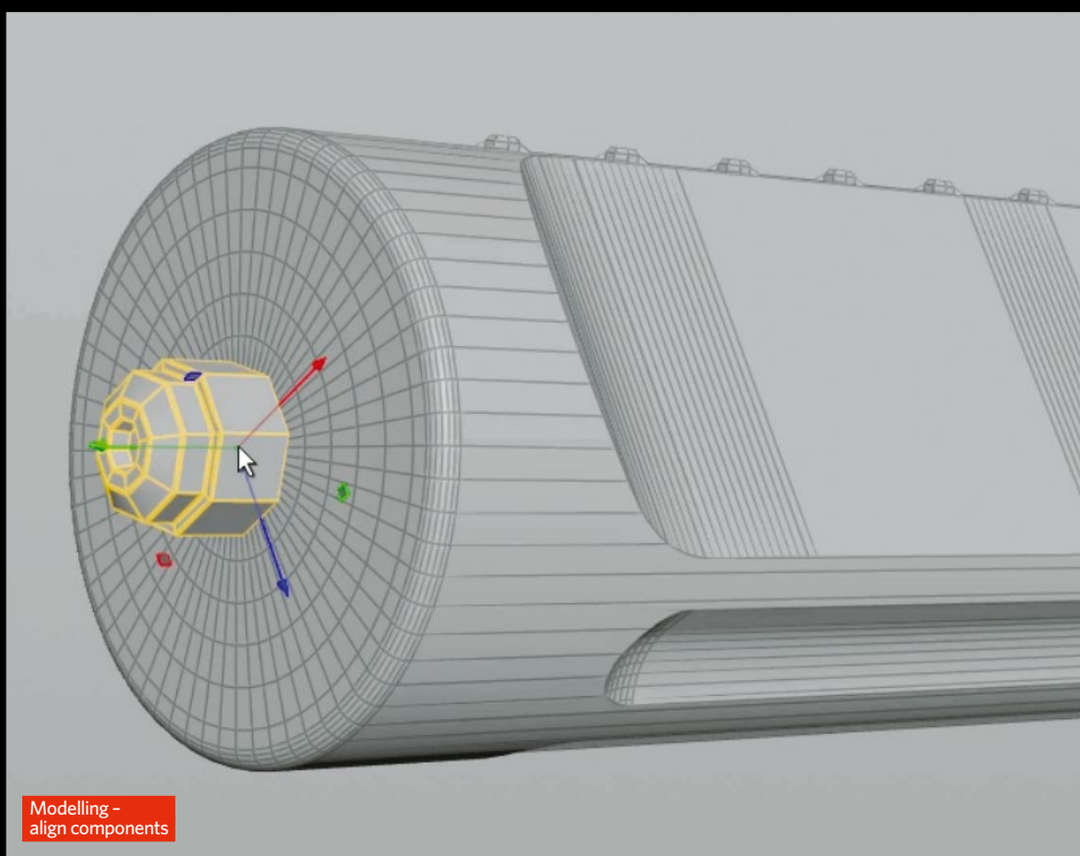
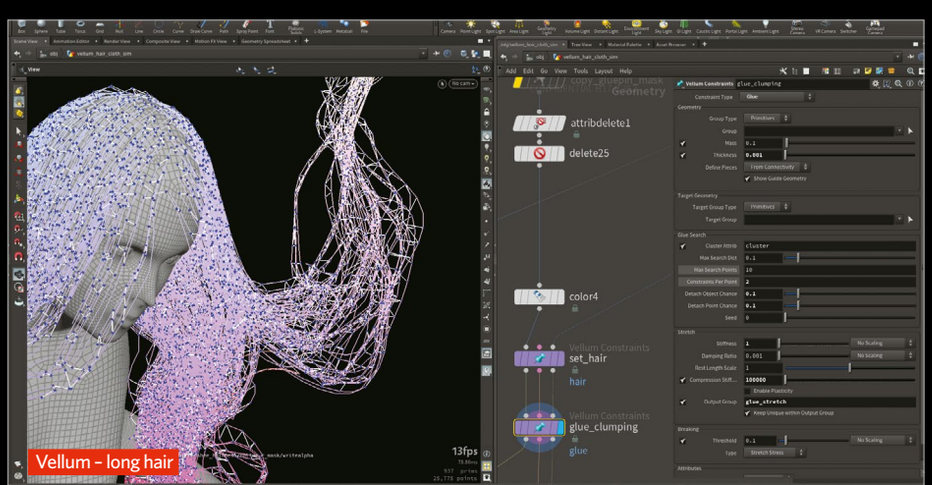
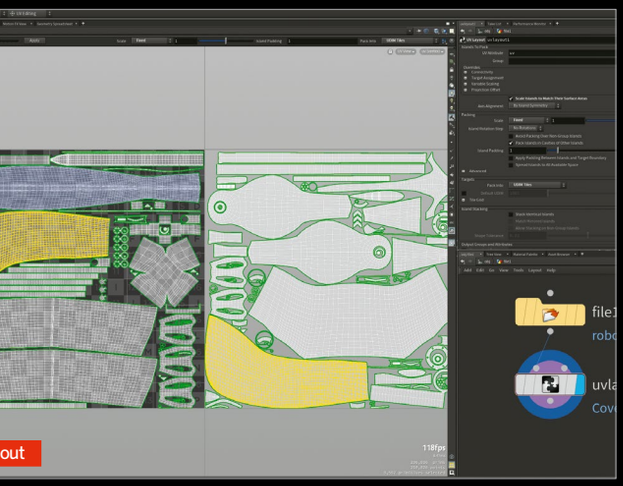
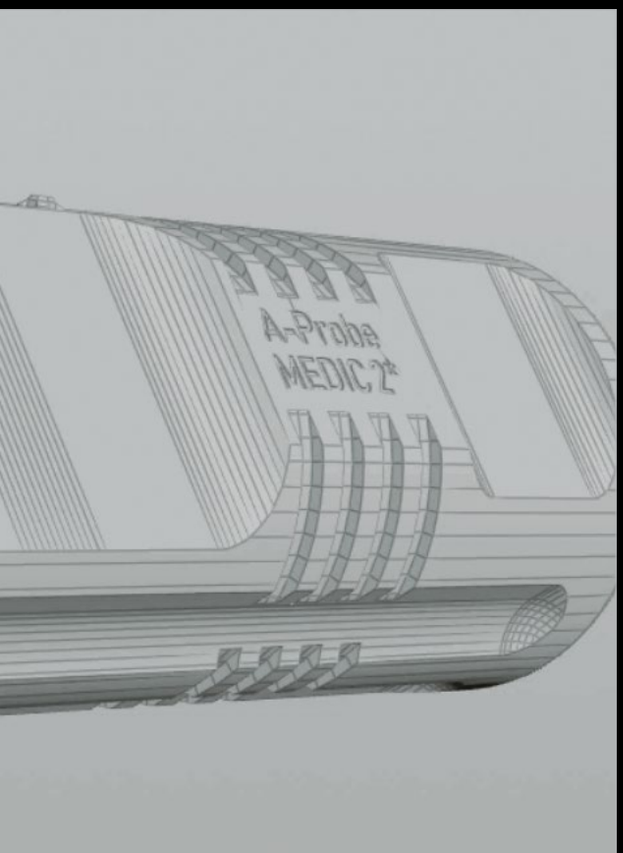






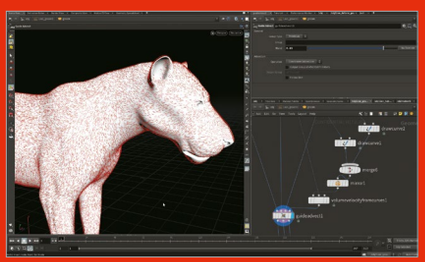






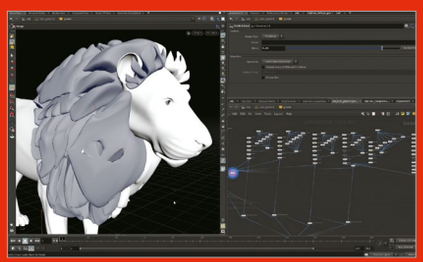
CREATE GUIDES FOR LION MANE

Learn how to create mane guides in Houdini 17 with Andriy Billchenko



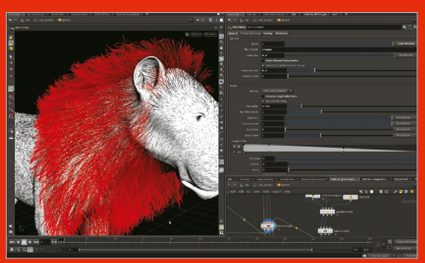
01 The main forms – Guide Advect

I usually create basic forms using Guide Advect. Using various options for the advection operation and applying various geometries to the fourth input, you can very quickly create the basic shape of the hairstyle. I first used the advection operation Constrained Advection to properly direct all the little hairs along the surface of the body.



02 Mane proxy geometry

Using modelling tools, I created proxy geometry for the mane. Houdini provides many tools for this (eg Topobuild, PolyExtrude, Boolean, Edit). To more easier manipulate the guides, I created individual proxy geometry. Then, I put several Guide Advects with Fill Collision Field and included Output Group of Affected Primitives.



03 Refinement and randomisation

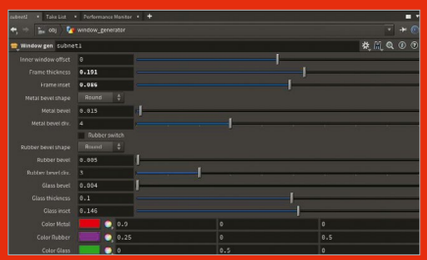
Now using the groups that I created in Guide Advect, I can refine the shape of the mane by editing each part separately. For this, I used Guide Groom by alternately switching between primitive groups in the Initial Setup Primitive Group. Then I used Hair Clump to make clumps and curling. I used the Guide Mask for masks and the Guide Process for randomisation of length, bend, frizz and so on.

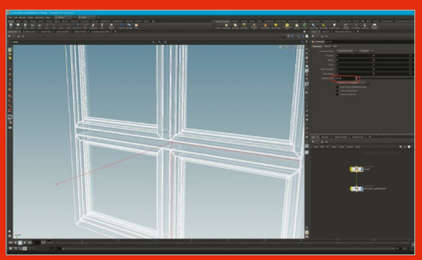
04 Don't be afraid to experiment

This is the main set of operators that I made use of to create guides for the lion's mane. Of course, you can do it in a completely different way. Do not be afraid to experiment. This is the beauty of Houdini. It gives you a limitless amount of possibilities for your imagination. Additionally, the knowledge of other areas in Houdini and VEX will expand your potential in grooming.

CREATING A WINDOW HDA IN HOUDINI

Make a parametric window asset and use it in Houdini Engine for 3ds Max with Ian Bonifacic

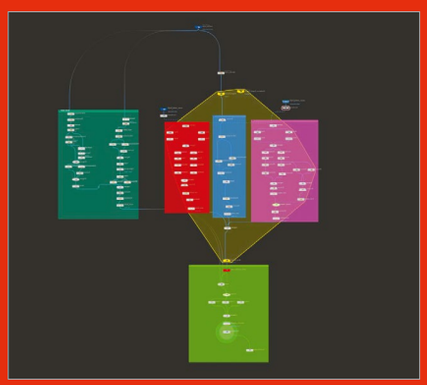


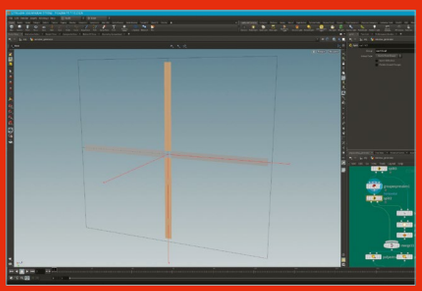


01 Plan out your HDA in advance Try to figure out how you're going to use your windows/HDA and incorporate them/it in your workflow.

Think about what you want to have as your entry data, so you can plan out your end data (end product).

02 It's all about the scale This was one of the first problems I had, figuring out the scale from 3ds Max to Houdini and back. Changing units won't help you here. The easiest thing to do is just use Transform node after the File node of your import geometry and scale everything by 0.01. After finishing your whole hierarchy, add another transform node at the end and scale everything by 100. This works perfectly.

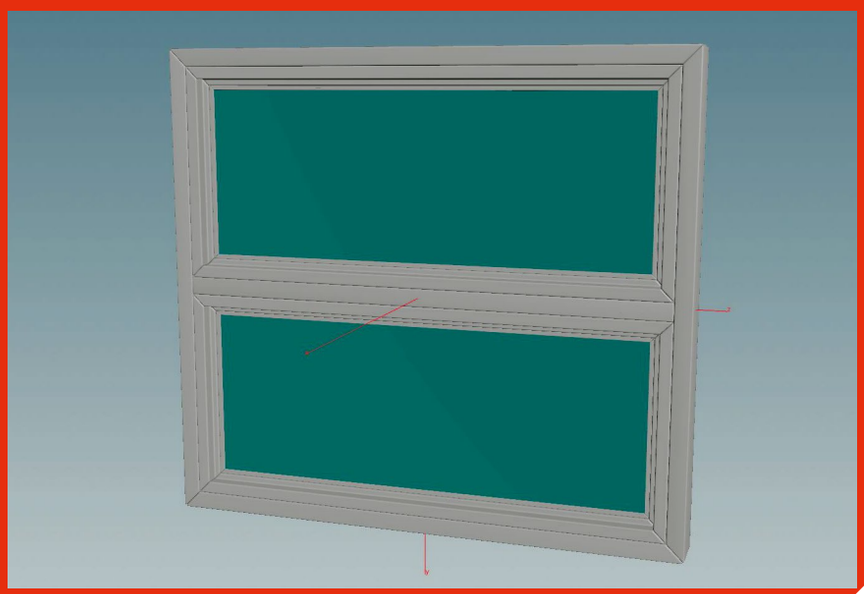




03 Segment a problem When trying to solve complicated problems, try segmenting them into smaller tasks. By doing this, it's easier to stay motivated and solve sometimes formidable tasks.

You will feel accomplishment after solving each small task, and one-by-one you will get to the end solution to your problem.

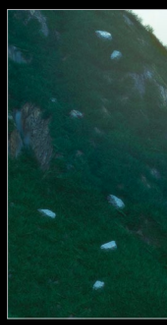
04 Groups = gold The Group node in Houdini is one of the most important features I've learnt about while developing this HDA. Group and tag everything you could possibly need for your end product (HDA). With a couple of smart groups, you can achieve limitless control, which can then be linked to your sliders in the HDA.



Whitewater Solver, you can get a more natural look than before. **Igor Zanic**

SAVING TIME

One good thing with the new Whitewater Solver is that the result is almost the same if you were to use low, mid or high res simulation, due to repellent and stiffness attributes. So you can really save on main sim times if you have different angles of your camera, but you need to maintain the same foam look. **Igor Zanic**



TERRAINS

HEIGHTFIELD ERODE

Having tons of controls on erosion can allow you to art direct the shape of your terrain very easily. The terrain generation workflow in Houdini involves starting on a low-resolution HeightField where the erosion gives you strong and deep results, which will help you to block out the shape you desire. Then, slowly increase the resolution with each erosion pass to get the fine details that can be seen in real-life terrain. Fine details are added later in High Res Erosion Passes. **Rajendra Khirodkar**

HEIGHTFIELD DISTORT

We have two distortion nodes in Houdini 17: HF Distort By Noise and HF Distort By Layer. Distort by Layer, newly added in Houdini 17, gives you control over warping and distorting features along a vector field. Use the Swirl Mode to sharpen or smooth out the top edges of your terrain. Using Distort by Layer just before a High-Res Erosion will give a very natural feathering to the erosion. Distort by Noise gives natural results when applied at the very end, usually after the last Erosion node on the highest resolution HeightField. **Rajendra Khirodkar**

CHARACTER

INTERACTIVE FOLDER TABS

Cmd/Ctrl+right-clicking on a folder tab reveals a number of actions available to affect all channels contained within the folder. This makes it easy to perform common operations on collected channels all at once. Cmd/Ctrl+right-click on a folder tab to: set keyframes on all channels in the folder, create a channel group from the folder contents, and copy and paste channel values. **John Mariella**

DRIVE BLENDSHAPES WITH POSE SPACE DEFORMATION

You can drive Blendshapes automatically by posing your character and sculpting the shapes your character should deform into whenever your skeleton approaches the pose joint angles. **John Mariella**

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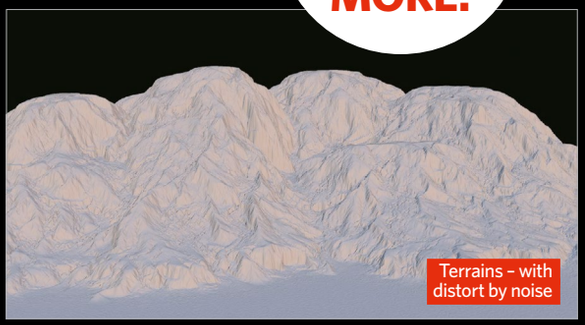

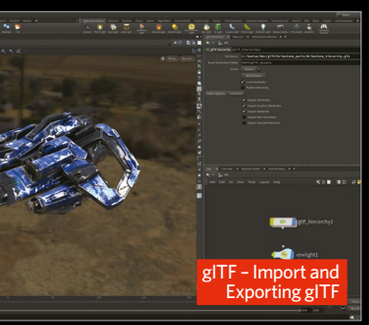

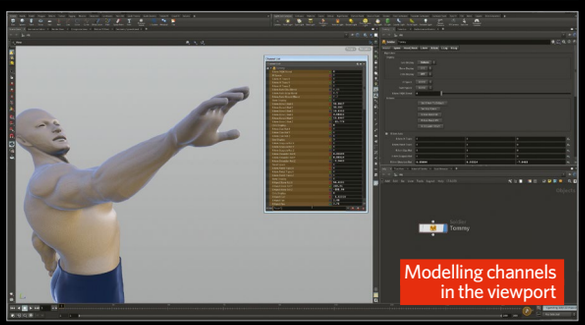

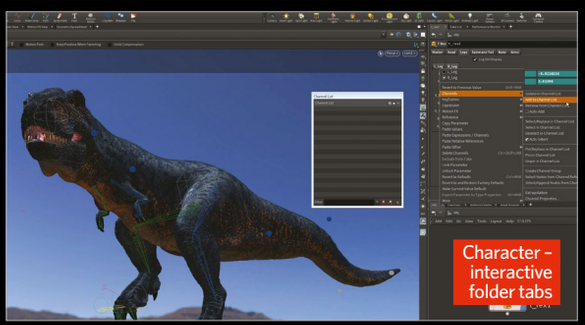

glTF IN HOUDINI ENGINE

HOUDINI 17 AND glTF

GITF (GL Transmission Format) is a JSON-based open-standard file format for 3D scenes and models. Given its growing popularity, especially in game development and in real-time game engines, support for both importing glTF files and exporting geometry in glTF 2.0 format was added to Houdini 17. **Seelan Vamatheva**

IMPORT AND EXPORTING glTF

The Houdini glTF importer allows for loading in scenes with transform hierarchy or individual objects, along with their materials using Principled Shaders and Textures. Similarly, the glTF exporter can export scenes or individual objects with their materials and textures. **Seelan Vamatheva**

MODELLING

POLYDRAW

PolyDraw allows you to free-hand draw polygons in an empty scene. This is useful when you need to trace base shapes using blueprints in orthographic views.

Within PolyDraw are additional tools that allow you to straighten insert edge-loops, split edge, slide along edge, smooth-relax, brush move, make circle and more. **Fianna Wong**

CONSTRUCTION PLANES

You can quickly set Construction Planes to an edge or face, so that you can specify the orientation and placement of geometry to align and continue building upon. You can also bookmark up to four different construction planes, to save and jump between, when modelling. **Fianna Wong**

RETIME

SET YOUR RANGE

You have the option of manipulating your animation by Frame, Time, Speed, Shift Range and Fit Range. Use pre- and post-cycle options to loop animation cycles and zigzag if the cycle isn't fully synced. Using the Speed option is a good starting point for creating fast or slow-motion shots. **Liam Hoyle**

SET THE INTERPOLATION (SMOOTHNESS BETWEEN FRAMES)

These parameters allow you to control the blending between frames (linear, cubic or subdivision) and works best when tackling pyro and fluid simulations. To avoid unwanted pulsating, and to average artefacts between frames, make sure to use the resulting retimed and interpolated field from the tool. **Liam Hoyle**